

REMARKS

The Examiner has rejected claims 1, 5-9, 12-13, 17, 20, 21, and 31-32 under 35 U.S.C. § 102(e) as being anticipated by Yin et al. U.S. Patent No. 6,379,575. Claim 2 is rejected under § 103(a) as being unpatentable over Yin et al. Claims 14-16 and 30 are rejected under § 103(a) as being unpatentable over Yin et al. in view of Tsai et al. U.S. Patent No. 6,592,817. Claims 10 and 11 are rejected under § 103(a) as being unpatentable over Yin et al. in view of Chow et al U.S. Patent No. 6,872,322. Claim 18 is rejected under § 103(a) as being unpatentable over Yin in view of Kim et al. U.S. Patent No. 6,436,303. Claims 23 and 24 are rejected under § 103(a) as being unpatentable over Yin et al. in view of Nakata et al. U.S. Patent No. 5,989,928.

Rejection under § 102(e)

With respect to the rejection of Claims 1, 5-9, 12-13, 17, and 20-21 under § 102(e) over Yin et al., Applicants respectfully traverse. Independent claim 1 distinguishes over the Yin et al. patent for at least the reason that the erosion product that is monitored is an erosion product of the system component during the process. Claim 1 has been amended to specify that the processing system is for processing semiconductor substrates, and that the system component being monitored is different than the semiconductor substrates processed in the processing system. Yin et al. also consistently refer to the substrates and the system components as being different. See, e.g., Abstract generally, and Col. 12, lines 43-55 where it is described that after substrate processing, the substrate is removed from the etching chamber, and then the etching chamber now absent the substrate is cleaned to remove etch residue from chamber walls and components.) Persons having ordinary skill in the art do not equate system components with substrates processed in the system, and thus, the Examiner's position that the wafer (substrate) in Yin et al.'s method is a system component is contrary to Yin et al. and to ordinary usage in the art of those terms.

Yin et al. do not teach monitoring the erosion product of a system component. As explained in col. 10, line 39 to col. 12, line 42 of Yin et al., a semiconductor substrate placed within the etching chamber is etched with an energized etchant gas. This etching process is monitored and stopped upon detection of a specified change in light emissions corresponding to detectable gaseous species derived from the etched substrate. Thus, Yin et al. monitor only erosion products derived from the etched substrate, not from a system component. After the etching process, as or after the substrate is being transported out of the chamber, the chamber is subjected to a cleaning and conditioning process to remove etch residues from system components "substantially without eroding the walls and components in the chamber." (E.g., Col. 14, lines 17-19.) Yin et al. do not mention a monitoring process for erosion products with respect to the cleaning and conditioning step.

For there to be anticipation of the claims herein, Yin et al. must teach each and every element of the claimed invention. As explained in col. 10, line 39 to col. 12, line 42 of Yin et al., the erosion products that are monitored are derived from the etched substrate during the substrate etching process. Yin et al. do not teach or suggest that the erosion product that is monitored is an erosion product of the system component by the reactant gas during the substrate etching process. Furthermore, Yin et al. do not teach or suggest that any erosion product is monitored during the cleaning process. Because Yin et al. do not teach, during any step of their multi-step process, the monitoring of an erosion product of a system component material, there can be no anticipation of the claimed subject matter of claim 1 and its dependent claims. It is therefore respectfully requested that the rejection of claims 1, 5-9, 12-13, 17, and 20-21 under § 102(e) over Yin et al. be withdrawn.

With respect to the rejection of Claims 31 and 32 under § 102(e) over Yin et al., Applicants respectfully traverse. Independent claim 31 has also been amended in the same manner as claim 1, and distinguishes over Yin et al. for at least the reason that the erosion product that is monitored is an erosion product of the protective coating on a system component

during the process, where the system component is different than the semiconductor substrates being processed in the processing system. As explained in col. 6, line 66 to col. 7, line 10 of Yin et al., the walls of the etching chamber are coated with a ceramic material, such as boron carbide, boron nitride, silicon, silicon oxide, silicon carbide, or silicon nitride, to protect the walls from chemical erosion in particular etchant gas compositions. However, Yin et al. do not teach or suggest that the erosion product that is monitored is an erosion product of the protective coating. Again, Yin et al. only disclose monitoring erosion products formed from materials of the substrate as the substrate is being etched to determine when to stop the etching process. Because Yin et al. do not teach, during any step of their multi-step process, the monitoring of an erosion product of a protective coating material on a system component, there can be no anticipation of the claimed subject matter of claim 31 and its dependent claim. It is therefore respectfully requested that the rejection of claims 31 and 32 under § 102(e) over Yin et al. be withdrawn.

Rejections under § 103

With respect to the rejection of Claim 2 under § 103(a) over Yin et al., Applicants respectfully traverse. "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP § 2141.02 (citing *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 USPQ 303 (Fed. Cir. 1983), *cert denied*, 469 U.S. 851 (1984)). Yin et al. disclose subjecting the chamber to a cleaning and conditioning process to remove etch residues from system components "substantially without eroding the walls and components in the chamber." (Col. 14, lines 17-19.) Yin et al. also state that "The power level should be sufficiently high to provide a cleaning gas that is sufficiently reactive to remove substantially all the etch residue on the chamber walls and components without damage to the underlying structures. An excessively high power level P_L will cause the highly activated gaseous species to erode the chamber walls." (Col. 14, lines 33-37). In Col. 14, lines 54-58, Yin et al. state that quick bursts and quick removal of the cleaning gas from the chamber "reduces the

possibility of dissociated species from recombining to form other chemical species that erode the chamber surfaces and components." These are examples of statements by Yin et al. that clearly show that Yin et al. disclose specifically avoiding erosion of the chamber walls and other components. In addition, there is no teaching or suggestion in Yin et al. to monitor erosion products of the materials of the chamber walls and other system components. One skilled in the art would not be led to monitor for such erosion products since Yin et al. specifically seek to avoid creating such erosion products. Claim 1 and its dependent claims in the present application, including claim 2, permit the system component to be eroded as an indication of when to stop the cleaning process. This is contrary to the teachings of Yin et al. Each prior art reference must be evaluated in its entirety, and considering Yin et al. as a whole including the portions that lead away, there is no teaching, suggestion or motivation to modify the reference to arrive at the present invention. Therefore, Applicants respectfully request that the rejection of claim 2 under § 103(a) be withdrawn.

With respect to the rejection of Claims 14-16 and 30 under § 103(a) over Yin et al. in view of Tsai et al., Applicants respectfully traverse for at least the same reasons provided with respect to the rejections of claims 1 and 2 over Yin et al. The Tsai et al. patent does not cure the deficiencies of Yin et al. Specifically, Tsai et al. do not teach or suggest monitoring the system for release of an erosion product of the system component itself. Tsai et al. avoid erosion of the system component, whereas Claim 1 and its dependent claims in the present application permit the system component to be eroded as an indication of when to stop the cleaning process. Tsai et al. state in col. 1, line 56-62 that "[i]t is also desirable to clean chamber walls and surfaces without erosion of chamber surfaces" and "[t]he present invention satisfies these needs." The monitoring process of Tsai et al. monitors the effluent in various ways, but there is no teaching or suggestion that the effluent be monitored for an erosion product of the system component itself. In fact, Tsai et al. teach against monitoring the system for release of an erosion product of the system component itself because the Tsai et al. patent specifically strives to avoid any erosion of

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the system component. Where the prior art teaches against the claimed invention, the rejection cannot stand. Therefore, Applicants respectfully request that the rejection of claims 14-16 and 30 under § 103(a) be withdrawn.

With respect to the rejection of Claims 10 and 11 under § 103(a) over Yin et al. in view of Chow et al., Applicants respectfully traverse for at least the same reasons provided with respect to the rejections of claims 1 and 2 over Yin et al. The Chow patent does not cure the deficiencies of Yin et al. Specifically, Chow et al. do not teach or suggest monitoring the system for release of an erosion product of the system component itself. It is therefore respectfully requested that the rejection of Claims 10 and 11 under § 103(a) be withdrawn.

With respect to the rejection of Claim 18 under § 103(a) over Yin et al. in view of Kim et al., Applicants respectfully traverse for at least the same reasons provided with respect to the rejections of claims 1 and 2 over Yin et al. The Kim et al. patent does not cure the deficiencies of Yin et al. Specifically, Kim et al. do not teach or suggest monitoring the system for release of an erosion product of the system component itself. It is therefore respectfully requested that the rejection of Claim 18 under § 103(a) be withdrawn.

With respect to the rejection of Claims 23 and 24 under § 103(a) over Yin et al. in view of Nakata et al., Applicants respectfully traverse for at least the same reasons provided with respect to the rejections of claims 1 and 2 over Yin et al. The Nakata et al. patent does not cure the deficiencies of Yin et al. Specifically, Nakata et al. do not teach or suggest monitoring the system for release of an erosion product of the system component itself. It is therefore respectfully requested that the rejection of Claims 23 and 24 under § 103(a) be withdrawn.

In view of the foregoing amendments to the claims and remarks given herein, Applicants respectfully believe this case is in condition for allowance and respectfully request allowance of the pending claims. If the Examiner believes any detailed language of the claims requires further discussion, the Examiner is respectfully asked to telephone the undersigned

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attorney so that the matter may be promptly resolved. The Examiner's prompt attention to this matter is appreciated.

Applicants are of the opinion that a one-month extension of time is due with this Response. Payment of the charge due for this extension of time is made on the attached Electronic Fee Sheet. If any additional charges or credits are necessary to complete this communication, please apply them to Deposit Account No. 23-3000.

Respectfully submitted,

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